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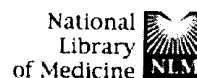
The bifunctional enzyme chitosanase-cellulase produced by gram-negative microorganism *Myxobacter* sp. AL-1 is high similar to *Bacillus subtilis* endoglucanases.

Pedraza-Reyes M, Gutierrez-Corona F.

Instituto de Investigacion en Biologia Experimental, Facultad de Quimica, Universidad de Guanajuato, Apdo. Postal 187, Guanajuato 36000, Guanajuato, Mexico. pedrama@quijote.ugto.mx

The gram-negative bacterium *Myxobacter* sp. AL-1 produces chitosanase-cellulase activity that is maximally excreted during the stationary phase of growth. Carboxymethylcellulase zymogram analysis revealed that the enzymatic activity was correlated with two bands of 32 and 35 kDa. Ion-exchange-chromatography-enriched preparations of the 32-kDa enzyme capable of degrading the cellulose fluorescent derivatives 4-methylumbelliferyl-beta-D-cellobioside and 4-methylumbelliferyl-beta-D-celotrioside. These enzymatic preparations showed a greater capacity at 70 degrees C than at 42 degrees C to degrade chitosan oligomers of a minimum size of six units. Conversely, the beta-glucanolytic activity was more efficient at attacking carboxymethylcellulose methylumbelliferyl-celotrioside at 42 degrees C than at 70 degrees C. The 32-kDa enzyme was purified more than 800-fold to apparent homogeneity by a combination of ion-exchange and molecular-exclusion chromatography. Amino-terminal sequencing indicated that mature chitosanase-cellulase has more than 70% identity with endoglucanases produced by strains DLG, P, and 168 of the gram-positive microorganism *Bacillus subtilis*.

PMID: 9297470 [PubMed - indexed for MEDLINE]



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Temporal secretion of a multicellulolytic system in Myxobacter AL-1. Molecular cloning and heterologous expression of cel encoding a modular endocellulase clustered in an operon with cel48, an exocellobiohydrolase gene.

Avitia CI, Castellanos-Juarez FX, Sanchez E, Tellez-Valencia A, Fajardo-Cavazos P, Nicholson WL, Pedraza-Reyes M.

Institute of Investigation in Experimental Biology, Faculty of Chemistry, University of Guanajuato, Mexico.

The Gram-negative soil micro-organism *Myxobacter* sp. AL-1 possesses five extracellular cellulases, the production of which is regulated by the cell cycle. We cloned the complete gene for one of these cellulases, termed cel9, which encoded a 67-kDa modular family 9 endoglycohydrolase, which was produced during the stationary phase of growth and was strongly enhanced by cel9. The predicted product of cel9 matches the structural architecture of other family 9 cellulases such as *Thermonospora fusca* endo/exocellulase E4. Cel9 was synthesized in *Escherichia coli* from a multicopy plasmid and in *Bacillus* from the isopropyl thiogalactoside-inducible Pspac promoter and was purified from the culture medium. Thermal stability, optimum pH and temperature dependence of Cel9 were similar when expressed from either source, and indistinguishable from related cellulases produced by thermophilic bacteria. Downstream from cel9 was found a partial ORF, designated cel48, the deduced product of which was highly similar to bacterial exocellobiohydrolases and processive endoglucanases belonging to family 48 of the glycosyl hydrolase family. The cel9 and cel48 genes appear to be arranged as part of an operon.

PMID: 11106416 [PubMed - indexed for MEDLINE]

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